be useful in districts remote from medical aid. Courses of elementary lectures are also given, both at the college and at the United Service Institution, open to all who may expect to reside or travel in the tropics. The "Year Book" contains details of the college and its curriculum, and useful directions for the preservation of health in the tropics.

IN the short notice of Mr. Cecil Hawkins's "Elementary Geometry" in NATURE of June 30 (p. 193), reference was made to the absence of numerical answers in the copy supplied. Mr. Hawkins asks us to state that the book is also supplied with answers if desired.

MESSRS. T. C. AND E. C. JACK, of Edinburgh, have submitted for our inspection four of the plates of a stereoscopic atlas of anatomy, edited by Dr. David Waterston, to be published by them in the autumn. The application of the stereoscopic principle to anatomical illustrations seems, from these examples of it, likely to prove of real assistance to medical and biological students. The plan has already been adopted with success in the teaching of geography and the illustration of books of travel, and there is every likelihood that this further adaptation of the stereoscope to educational work will meet with general approval from lecturers on anatomy. Each stereograph is accompanied by a brief description written by the editor, and the illustration and description are mounted on one card so as to facilitate reference from one to the other. The series will comprise 250 separate stereographs, and these will be contained in cases. The work will be issued at intervals in sections of about fifty stereographs.

OUR ASTRONOMICAL COLUMN.

NEW ELEMENTS AND EPHEMERIS FOR COMET 1904 *a*.—In No. 55 of the Lick Observatory *Bulletins*, Prof. A. O. Leuschner, of the Berkeley Astronomical Department, gives a set of elements and an ephemeris for comet 1904 *a*, calculated from observations made by Messrs. Aitken, Crawford, and Maddrill on April 17, 22, and 29 respectively.

No. 56 of the same publication contains a second set of elements and an ephemeris calculated by Messrs. Aitken and Maddrill from observations made at Lick on April 17, May 8, and May 24. The following are the elements given :—

$$T = 1904 \text{ March } 6{\cdot}9049 \text{ G.M.T.}$$
$$\left.\begin{aligned} \omega &= 53^\circ\ 27'\ 13''{\cdot}8 \\ \Omega &= 275^\circ\ 46'\ 5''{\cdot}5 \\ i &= 125^\circ\ 7'\ 33''{\cdot}1 \end{aligned}\right\} \text{Mean equinox of 1904 0}$$
$$\log q = 0{\cdot}432475$$

The ephemeris (for oh. G.M.T.) shows that on July 14·5 the comet will occupy the following position in the constellation Canes Ven. :—True $\alpha = 12$h. 24m. 28s. True $\delta = +50^\circ\ 37'\ 50''$, and afterwards will travel very slowly in a southerly direction. As the brightness of the comet is now only 0.37 of its original magnitude, only the larger telescopes will be of any use in observing this object.

THE SOLAR PARALLAX AS DETERMINED FROM THE EROS PHOTOGRAPHS.—At the meeting of the Royal Astronomical Society on June 10, Mr. Hinks gave an interesting and instructive account of the Cambridge reduction of all the available photographs of Eros obtained during the period November 7–15, 1900. One of the chief features of the paper was a description of the various errors which appeared during the reduction and of the methods employed for their elimination.

The value obtained for the solar parallax in this preliminary result was $8''{\cdot}7966 \pm 0''{\cdot}0047$, and this agrees, within the errors of observation, with that previously obtained by Sir David Gill, whilst the probable error is as small as that obtained by him.

EXPERIMENTS ON THE VISIBILITY OF FINE LINES.—*Bulletin* No. 10 of the Lowell Observatory contains the details and results of a further series of experiments, performed by Messrs. Slipher and Lampland, on the visibility of fine lines at various distances. The experiments were exactly similar to those previously carried out with a fine wire of 0.7 inch diameter, except that a fine blue line 0.7 inch in width, drawn on a white disc 8 feet in diameter, was observed at the same time as the wire. At a distance of 1450 feet, when the angular width of the disc was 19′ and that of the lines was $0''{\cdot}86$, the wire was certainly seen, but a fictitious line was seen accompanying what was supposed to be the real one.

The general results of the experiments indicated that the wire was more *generally* visible than the line, although at distances less than 400 feet the latter was the more readily seen.

VARIABILITY OF MINOR PLANETS.—Observations of the magnitudes of the minor planets Iris, Ceres, and Pallas, made by Herr J. Holetschek at Vienna during the years 1899 and 1903, are published in No. 3955 of the *Astronomische Nachrichten*. These show that the magnitude of Iris decreased from 7.4 to 7.6 between November 1 and November 6, 1899. Observing Ceres in April, 1899, it was found that the magnitude on April 9d. 14.5h. was 7.5, on April 13d. 11h. 8.1, and on April 14d. 15h. 6.9.

In the case of Pallas the following magnitudes were observed on the various dates named :—

1903	M.T. (Vienna)	Magnitude
March 23	7·6	8·4
24	7·6	8·7
24	9·8	8·6–8·7
25	7·7	8·4–8·5
26	7·6	8·5

A VARIABLE STAR CHART.—In No. 3959 of the *Astronomische Nachrichten*, Prof. Max Wolf publishes 25 charts, each showing the relative position of one of the 25 variables in Aquila mentioned in earlier communications published by him in the same journal. An accompanying table gives the chart number and the number, the position, the variation, and the designation of the comparison star for each variable.

THE LEEDS ASTRONOMICAL SOCIETY.—No. 11 of the annual *Journal and Transactions* of the Leeds Astronomical Society contains reprints of seven very interesting lectures, on a variety of astronomical subjects, delivered at the society's meetings during last year. A number of letters on current astronomical questions, contributed to various periodicals by the past president, Mr. C. T. Whitmell, are also reproduced. The frontispiece shows a number of photographic reproductions of ancient coins on which were depicted various astronomical symbols, and illustrates a lecture on that subject delivered by Mr. A. Dodgson. The programme of the meetings for 1904 promises some very interesting papers, whilst the report for 1903 shows the society to be in a thriving condition.

"ANNUARIO" OF THE RIO DE JANEIRO OBSERVATORY (1904).—The twentieth annual publication of the Rio de Janeiro Observatory contains a large amount of useful information on astronomical, meteorological, and general physical matters. The customary calendars and astronomical tables are given in part i. Parts ii., iii., and iv. contain tables of reduction for astronomical and meteorological observations. The usual tables for the conversion of foreign standards are given in part v., whilst the sixth and last section contains many useful records of the local meteorological and magnetic conditions for past years, including the variation of magnetic declination at Rio de Janeiro since 1660.

GEOLOGICAL SURVEYS OF THE UNITED STATES.

SINCE the appearance of the notice in NATURE of December 3, 1903, the following publications of the United States Geological Survey have been received.

I. *Bulletins.*

Of very wide interest is the essay on "The Correlation of Geological Faunas: a Contribution to Devonian Palæontology," by Prof. H. Shaler Williams (*Bulletin* No. 210). The observations are based on a critical examination of the

Devonian rocks of New York, Pennsylvania, and eastern Ohio, as in that region the stratigraphical succession and the continuity of the rocks were sufficiently clear to enable the author and his assistants to work out the relations between the geological formations and the distribution of life. The term fauna is commonly used in palæontology to indicate the list of fossils contained in a single formation, but as the author admits, the limits of formations vary considerably in different localities, and do not coincide with the limits of faunas. He introduces the term *faunule* to distinguish an aggregate of fossils associated either in a single stratum, or in several contiguous strata that may be many feet in thickness—the aggregate being composed of the same set of species. The *fauna*, on the other hand, is defined as an aggregate of local and temporary faunules in which is expressed a common, corporate aggregate of species. The faunule is limited to a single set of conditions. The fauna is to be discriminated by the dominant species, and it preserves its integrity and identity so long in succession, and so far in distribution, as the dominant species retain their ascendancy among their associates. The marine fauna itself is not the universally distributed marine life of a particular epoch, but the fauna of a particular environment of that epoch.

The facts recorded by the author show that migration, not of single species, but of the whole fauna has sometimes taken place. There has been transgression of one fauna over another, thus calling for the assumption that the limits of a formation based upon sudden change in the fossil contents cannot be regarded as synchronous for two parts of even the same province, and, wherever they are thus sudden and sharp, cannot be synchronous with the limits of either the earlier or later fauna in evidence. The detailed study of the migrations and recurrence of species is of the utmost importance, and in this respect alone we have much to learn. The author rightly remarks that for the practical purposes of geological mapping and the descriptions of geological structure the formations are the essential elements, while his statistics demonstrate the intrinsic value of fossils for measuring and indicating geological time. His observations show the necessity for a dual nomenclature —stratigraphical and biological—and they indicate also that "At present we know too little about fossil faunas to be able to predict in what manner their actual time limits will be defined or discriminated, but enough light has already been thrown upon the matter to show that it will be by means of the history which organisms have expressed in their continuous life and evolution that we may expect ultimately to mark off the stages of geological time."

"Notes on the Geology of South-western Idaho and South-eastern Oregon" are contributed by Mr. Israel C. Russell (*Bulletin* No. 217). The notes are the result of a rapid reconnaissance made with the special view of studying the artesian basins; these comprise large tracts of rich agricultural land, throughout which the conditions justify the opinion that flowing water may be obtained. Particular descriptions and illustrations are given of the cinder buttes and craters of the recent, but now extinct, volcanoes. At each of the volcanic centres it seems that the first eruptions were of the explosive type, and that the elevations then produced by the accumulation of projectiles were to a considerable extent buried by the subsequent quiet effusion of vast quantities of liquid lava (basalt).

"Descriptive Geology of Nevada South of the Fortieth Parallel and Adjacent Portions of California," by Mr. J. E. Spurr (*Bulletin* No. 208), contains particulars of a great variety of formations from Archæan to Carboniferous, also of Jura-Trias, Tertiary, and later deposits, as well as of granites, rhyolites, andesites, and other igneous rocks. The work is based on a series of traverses, and is to be regarded as a preliminary survey, as the topographic map is imperfect; but the records of facts observed are full of interest.

"The Geology of Ascutney Mountain, Vermont," is by Mr. R. A. Daly (*Bulletin* No. 209). In this work we have the results of an investigation of the lithology and geology of a plexus of eruptive rocks and of the metamorphic aureole in bordering schistose rocks. The author concludes with hypotheses on the manner of intrusion, on abyssal assimilation, and on the evidences of differentiation of the igneous masses.

"Stratigraphy and Palæontology of the Upper Carboniferous Rocks of the Kansas Section" is the title of a report by Messrs. G. I. Adams, G. H. Girty, and David White (*Bulletin* No. 211). This work summarises the information on the subject, including extensive faunal lists and such data as are available concerning the flora. The plants appear to represent the topmost Carboniferous, if not the so-called permo-Carboniferous, of western Europe.

Economic geology is dealt with in *Bulletins* Nos. 212, 213, 218, 219, 223, and 225. "The Oil Fields of the Texas-Louisiana Gulf Coastal Plain" are fully described by Messrs. C. W. Hayes and W. Kennedy; "The Coal Resources of the Yukon, Alaska," are discussed by Mr. A. J. Collier, who considers that with proper development there will probably be sufficient coal to supply local demands for some time to come; "The Ore Deposits of Tonopah, Nevada," are reported on briefly by Mr. J. E. Spurr, who points out that the most important mineral veins occur in the early Tertiary andesites, and that the values in the ores are entirely gold and silver; "Gypsum Deposits in the United States," by G. I. Adams and others, are treated with especial reference to economic conditions; and "Contributions to Economic Geology," 1902 and 1903, have been prepared by a number of authors under the direction of Messrs. S. F. Emmons and C. W. Hayes; these contributions relate to metalliferous deposits, coal, oil, gas, stone, cements, clays, fuller's earth, gypsum, phosphates, mineral paints, &c.

In *Bulletin* No. 220, Mr. F. W. Clarke has tabulated the "Mineral Analyses from the Laboratories of the U.S. Geological Survey, 1880 to 1903."

In *Bulletins* Nos. 214, 215, 216, 221, 222, 224, and 227, we have a catalogue and index of the publications of the United States Geological Survey, 1901 to 1903; bibliography and index of North American geology for 1902; catalogue and index of the publications of the Hayden, King, Powell, and Wheeler surveys; results of primary triangulation; geographic tables and formulas; gazetteer of Texas, edit. 2; and "The United States Geological Survey, its Origin, Development, Organisation, and Operations."

II. *Monographs.*

Monograph No. 44 contains the last work of Prof. Alpheus Hyatt, the "Pseudoceratites of the Cretaceous"; this was almost ready for the printer at the time of his death in January, 1902, and it has been edited by Mr. T. W. Stanton. It is illustrated by 47 plates, and these, together with the descriptions of species and the reference of these and other species to new genera of Ammonoidea, were arranged or selected by the author. As the editor remarks, "The multiplication of families, genera, and species will be understood by all who are acquainted with Professor Hyatt's habit of attempting to express in the terminology every important fact observed in the course of his investigations." In some cases the classification of the forms is incomplete, as the author's opinions on certain questions had evidently become much modified since his previous publications. The Pseudoceratites he speaks of as "an artificial group, including for convenience of treatment all the retrogressive genera of the Cretacic that have sutures with simple outlines resembling those of Triassic cephalopods, formerly included under the name Ceratites." Among the British forms referred to is *Ammonites* (*Mantelliceras*) *Mantelli*, of Sowerby.

Monograph No. 45 is on "The Vermilion Iron-bearing District of Minnesota," by Mr. J. Morgan Clements, and it is accompanied by a folio atlas of geological, mining, and topographic maps. This great iron-bearing district has an area of, approximately, 1000 square miles in north-eastern Minnesota, and it resembles the other iron-bearing districts of the Lake Superior region in that the rocks are of great geological antiquity. Iron ore was first noticed in the district in 1850, but its economic importance was not realised until long subsequently. The ores occur in four areas, one of which includes the Giant's Range, which attains a height of 2120 feet above sea-level. The rocks comprise Archæan, divided in ascending order into the Ely greenstone, the iron-bearing Soudan formation, and various granites. The greenstones, though highly altered, are largely of volcanic character, but with them are associated

some intrusive rocks which present in many cases a schistose character. The Soudan formation, the oldest sedimentary group in the district, is bent into prominent anticlines, but is otherwise intricately contorted and infolded with the greenstones; it comprises conglomerates with fragments of the older greenstones, and an outlying group of siliceous rocks, largely white cherts, with red jasper and carbonate-bearing chert, grünerite-magnetite-schist, blue hematite, magnetite, and small quantities of pyrite. The cherty rocks are banded, and the hematite occurs in certain places in masses of variable size, which constitute the ore deposits. These iron-bearing rocks are considered to be of sedimentary origin. The source of the iron was, in the first instance, the Ely greenstone. From this it was removed through the action of water and collected to form part of the sedimentary marine deposits of the Soudan formation. After the folding of the rocks this disseminated iron was carried by downward-percolating waters into places favourable for its accumulation. The methods of mining are described. There are descriptions also of the later intrusive rocks, of the Huronian and Keweenawan series, of the drifts, the Glacial lakes, and other topographic features.

Monograph No. 46, on "The Menominee Iron-bearing District of Michigan," by Mr. W. S. Bayley, is the sixth and last of a series of reports on the iron-bearing districts of the Lake Superior region. The area now described is a very important one, as it has yielded since 1877 nearly thirty millions of tons of iron-ore of Bessemer grade. The rocks comprise Archæan schists and granites, which appear on the borders of the district; in the central portions the iron-bearing Algonkian rocks, with basal conglomerate, occupy a trough of highly folded rocks, distinguished as the Lower and Upper Menominee series, there being a marked unconformity between them. These divisions correspond to the Lower and Upper Marquette series, and to the Lower and Upper Huronian of other areas. Above these folded rocks lie horizontal Palæozoic beds, comprising the Lake Superior sandstone and an Ordovician limestone. The Lower Menominee series comprises quartzite and dolomite, the latter affording a key to the folding. The gap between Lower and Upper Menominee series is marked by conglomerate at the base of the Upper series, which contains pebbles of jaspilite (iron-bearing), and these are taken to represent the Negaunee formation. The Upper Menominee series comprises also slates, quartzites, and jaspilites, these last-named being banded rocks composed of alternating layers of red jasper and ore-deposits. It is noted that the larger ore-deposits all rest upon relatively impervious foundations, which are in such positions as to constitute pitching troughs. The processes of concentration were the same as those worked out in other districts by Van Hise, being due to descending waters flowing in definite channels. The concentration was commenced after the folding of the rocks, and completed before the beginning of the Upper Cambrian. The subject is treated very fully from all points of view, structural and physiographic as well as economic, and it is profusely illustrated with maps, sections of the strata, microscopic sections of rocks, and pictorial views. There are also two plates of possible organic markings from the iron-bearing rocks of Chapin Mine; these were thought by Mr. W. S. Gresley to represent impressions of plants, track-marks, &c.

III. *Professional Papers.*

The United States Geological Survey has issued a series of "Professional Papers," of which we have received several examples. No. 11 is on "The Clays of the United States East of the Mississippi River," by Mr. Heinrich Ries. It is interesting to note that while kaolins occur in several States, the local output at present is insufficient to meet the demand. No. 12, by Mr. F. L. Ransome, deals with the "Geology of the Globe Copper District, Arizona." No. 13 is on "Drainage Modifications in Southeastern Ohio and Adjacent Parts of West Virginia and Kentucky," by Mr. W. G. Tight. The subject is one which attracts a considerable amount of interest, so far as it illustrates the history of rivers and the relation of the old to the present river systems. The author concludes that the high-level valleys of the region represent a connected system of an old drainage cycle which antedates the first advance of the ice of the Glacial period; that the deposition of the silts on the old valley floors and the deflection of the streams producing the present drainage system were due to the action of the advancing ice-sheet of the first Glacial epoch; that the extensive erosion of the present river valleys to depths below the present drainage lines was accomplished during an inter-Glacial interval of great duration; and that these inter-Glacial valleys were partially filled with débris by the flood waters of the last Glacial epoch, the post-Glacial erosion being represented by the channels cut in the floor of these deposits since the rivers have acquired their present volume. Paper No. 14, by Mr. Henry S. Washington, comprises a laborious but most useful work, entitled "Chemical Analyses of Igneous Rocks Published from 1884 to 1900, with a Critical Discussion of the Character and Use of Analyses." The analyses follow on from the last date of publication of Roth's "Tabellen," and include a few analyses of 1883 omitted from that work. The author insists on the importance of careful and precise work, lamenting that rock analyses are too often entrusted to inexperienced students. The work will be of the greatest value to petrologists. Paper No. 15 is on "The Mineral Resources of the Mount Wrangell District, Alaska," by Messrs. W. C. Mendenhall and F. R. Shrader. It deals with the occurrence of ores of copper, gold, silver, platinum, tin, mercury, osmiridium and iron, and also with a few indications of coal or lignite.

No. 16 is on "The Carboniferous Formations and Faunas of Colorado," by Mr. G. H. Girty. This work is based on the extensive collections of fossils of the Geological Survey and the National Museum, and its purpose is to ascertain, by means of the invertebrata, their grouping into local and formational faunas. It brings out the close relation which existed in Carboniferous time between the Colorado seas and those of the Mississippi valley. The Leadville, Millsap, and Ouray limestones which form the base of the Carboniferous, and which include a part of the Mississippian fauna, include also in their lower portion a distinctive Upper Devonian fauna. The Lower Carboniferous was followed by an epoch of elevation and erosion, and none but the early portion of the Mississipian time is represented in the Colorado sediments. This lower group comprises (1) the Weber formation, of dark carbonaceous shales and thin limestones, with fossils of Coal-measure type, and (2) the Maroon formation, a great series of conglomeratic beds and grits, surmounted by red sandstones. The same difficulties that have been met with in Britain are encountered in Colorado, and the author discusses at some length the question whether certain red beds are Carboniferous, Permian, or Triassic. The Wyoming "Red Beds series" appears to succeed the Maroon formation in places without a break, but the author regards it as really Triassic. The numerous descriptions of fossils are accompanied by ten plates.

No. 17, by Mr. N. H. Darton, is a "Preliminary Report on the Geology and Water Resources of Nebraska West of the 103rd Meridian." The geology and topographic features are described, and some remarkable monuments of erosion known as the Chimney rock, the Smokestack rock, and the Twin-sisters are represented on photographic plates. There is also a figure of the Titanotherium, which is found in the basal portion of the Tertiary strata.

In No. 18, Mr. J. P. Iddings contributes an essay on "Chemical Composition of Igneous Rocks Expressed by Means of Diagrams with Reference to Rock Classification on a Quantitative Chemico-mineralogical Basis." In introducing this work Mr. Whitman Cross remarks, "As a successful attempt at the elucidation of a complex problem the paper is of importance to all students of igneous rocks."

In No. 19, "Contributions to the Geology of Washington," by Mr. G. O. Smith and Mr. Bailey Willis, the authors deal chiefly with the origin of the physical features. No. 20, "A Reconnaissance in Northern Alaska," by Mr. F. C. Shrader, with notes by Mr. W. J. Peters, contains much interesting information about tracts hitherto unexplored. Among the rocks described are Silurian, Devonian, Carboniferous (?), Jura-Cretaceous, Cretaceous, and Tertiary, as well as Drift deposits. The mineral resources climate, population, and other subjects are dealt with.

IV. *Reports.*

Part i. of the twenty-fourth annual report for 1902–3 contains an account of the progress of the Survey by Mr. C. D. Walcott, director, who refers to the increase of work, and to the establishment of a separate hydrographic department under the charge of Mr. F. H. Newell. An obituary memoir, accompanied by a portrait, is given of Major J. W. Powell.

The detailed report on the "Mineral Resources of the United States," for 1902, by Mr. David T. Day, shows a continuation of the remarkable activity in the mineral industries, the total value exceeding one thousand million dollars—iron and coal being the most important products. There was a notable increase in the production of uranium and vanadium minerals, and these were nearly all shipped abroad in the crude state as mined. The production of bauxite was largely increased, while that of monazite, obtained chiefly from North Carolina and partly from South Carolina, showed a slight increase over the previous year. The production of crude petroleum and of natural gas also showed increase.

V. *Local Surveys.*

The Wisconsin Geological and Natural History Survey has sent copies of *Bulletins* Nos. 11 and 12. The former is a "Preliminary Report on the Soils and Agricultural Conditions of the North-central Portion of the State," by Dr. S. Weidman. It is illustrated by a soil map, on the scale of an inch to three miles, and this gives the general character of the soil over different "soil formations" or subsoils—in reality various alluvial and drift deposits. No. 12 is by Mr. C. D. Marsh on "The Plankton of Lake Winnebago and Green Lake," lakes of different types, one shallow, the other deep. As bearing on the question of fish-production, it is noted that Entomostraca, which furnish the basis of food for fishes, are more numerous in the deep than in the shallow lake.

We have received also vol. xiii. of the *Memoirs* of the Iowa Geological Survey, being the annual report for 1902 with accompanying papers. The papers comprise descriptions (seven in number) of various counties, by the State Geologist, Mr. Samuel Calvin, and his assistants. There is also a discussion of the requisite qualities of lithographic limestone, with a report on tests of the lithographic stone of Mitchell County, Iowa, by Mr. A. B. Hoen. The report is accompanied by a colour-printed plate drawn on the local stone and illustrating the quarry from which it was obtained. The sample, submitted for trial, was not wholly satisfactory, inasmuch as it was noticed in trueing the stone for printing that the surface-plane intercepted planes of bedding at small angle, but there is reason to hope that, as the stone is worked, larger and more perfect slabs may be obtained. H. B. W.

DISINFECTING STATIONS.

AN interesting article upon disinfecting stations, written by Prof. Henry R. Kenwood and Mr. P. J. Wilkinson, appears in the most recent issue of the *Journal* of the Sanitary Institute (vol. xxv., part i., April; London: Offices of the Sanitary Institute, Parkes' Museum, Margaret Street, W.).

It is now well recognised that the disinfection of textile articles can be effected by the use of steam more quickly, more certainly, and with less damage to the article disinfected than by the use of any other agent; and a steam disinfecting station is now considered an essential provision by sanitary authorities. As the steam penetrates into the interstices of the colder articles it undergoes condensation, and imparts its latent heat instantaneously to the colder objects in contact with it. Steam thus condensed into water occupies only a very small fraction (about 1/1600) of its former volume, and to fill the partial vacuum thus formed more steam presses forward, in its turn becoming condensed and yielding up its latent heat, and so on until the whole mass has been penetrated.

Saturated steam may be used as current steam at about atmospheric pressure; but there is an advantage, in point of time, in the employment of steam disinfecting apparatus in which saturated steam is used under pressure, and higher temperatures are thereby obtained, when very highly resistant organisms have to be destroyed.

The time required for disinfection by steam obviously depends upon the resistance of the organism to be destroyed, the bulk of the infected articles, and the pressure of the steam employed. The best researches indicate a pressure of 10 lb. (and therefore a temperature of 115° C.) for twenty minutes as trustworthy in general practice.

The steam may be generated in a special boiler, from whence it is conducted to the disinfecting chamber, and such a boiler is sometimes made to supply steam for laundry purposes; or the lower part of a jacketed oven may be filled with water, and by firing directly under the machine the steam may be raised in the jacket of the disinfector itself. This arrangement favours compactness and economy, but a separate boiler is more accessible for cleansing and repairs.

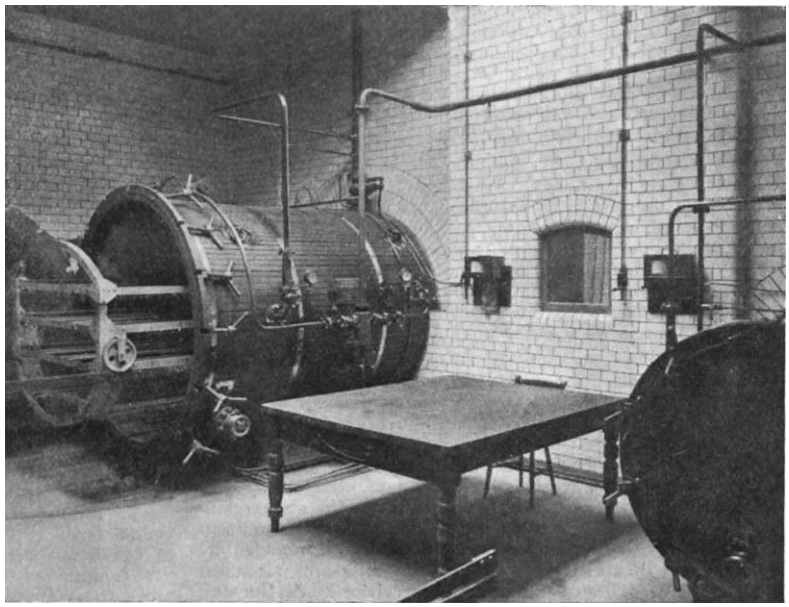

FIG. 1.—Interior of non-infected Chamber at the Fulham Disinfecting Station.

The various stoves now employed for disinfecting by steam may be classified as follows:—

(1) Stoves in which steam without pressure is employed. These are, of course, the simplest and cheapest.

(2) Those in which steam at low pressure (2, 3 or 5 lb. per sq. in.) is used. Although the temperature of 110° C. which can be reached by some of these stoves is generally sufficient, a higher temperature can never be employed in them. These stoves, though cheaper, meet with less general acceptance in this country than

(3) Those in which steam at high pressure (10 lb. and over) can be employed.

A temperature of 115° C. to 120° C. can be obtained in these stoves, and an exposure of articles for about twenty minutes will suffice for disinfection.

A disinfection station should comprise:—

(1) Two rooms completely separated from each other by